

**Amendments to the Claims:**

This listing of claims will replace all prior versions, and listings, of claims in the application:

**5 Listing of Claims:**

Claim 1 (currently amended): A method of defect root cause analysis comprising following steps:

- providing a sample which comprises a plurality of defects;
- performing a defect inspection to detect sizes and locations of the plurality of
- 10 defects;
- performing a chemical state analysis of the sample;
- performing a mapping analysis according to a result of the chemical state analysis, wherein the mapping analysis comprises:
- forming the defects into a defect pattern; and
- 15 combining the defect pattern with a predetermined pattern on the sample;
- and
- analyzing the root cause of the defects according to ~~a result of the mapping~~
- analysis the combination of the defect pattern and the predetermined pattern on the
- sample.

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Claim 2 (original): The method of claim 1 further comprising performing a defect classification after finishing the defect inspection for judging a defect type of the defects and performing a corresponding chemical state analysis according to the defect type of the defects.

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Claim 3 (original): The method of claim 1 wherein an auger analysis is performed in the chemical state analysis when the defects are smaller than 0.2  $\mu$ m or are not single phase particles.

30 Claim 4 (original): The method of claim 3 wherein the auger analysis utilizes a

scanning auger microscopy (SAM) or an auger electron spectroscopy (AES) to perform the chemical state analysis of the sample.

5 Claim 5 (original): The method of claim 1 wherein an energy dispersive spectrometer (EDS) is utilized to detect in the chemical state analysis when the defects are equal to or larger than 0.2  $\mu$  m, single phase, or thick particles.

10 Claim 6 (original): The method of claim 1 wherein the chemical state analysis comprises a point scan analysis, delayer analysis, and depth profile analysis.

Claim 7 (currently amended): A method of defect root cause analysis comprising following steps:

providing a sample with a plurality of defects;  
performing a voltage contrast to identify locations of the defects;  
15 cutting the sample with a focus ion beam (FIB) to expose a cross-section of the sample;  
utilizing auger electrons to perform a chemical state analysis of the cross-section of the sample;  
performing a mapping analysis according to a result of the chemical state  
20 analysis, wherein the mapping analysis comprises:  
forming the defects into a defect pattern; and  
combining the defect pattern with a predetermined pattern on the sample; and  
judging a root cause of the defect generation according to ~~a result of the mapping analysis~~ the combination of the defect pattern and the predetermined pattern on the  
25 sample.

30 Claim 8 (original): The method of the claim 7 wherein the method utilizes a scanning auger microscopy (SAM) or an auger electron spectroscopy (AES) to perform a chemical state analysis of the cross-section of the sample.

Claim 9 (original): The method of claim 7 wherein the chemical state analysis comprises a point scan analysis.